

1 HOUSING ASSEMBLY FOR INSTALLATION IN A WINDOW FRAME

2 CROSS-REFERENCE TO RELATED APPLICATIONS

3 -~~Not Applicable~~ *93*

4 STATEMENT REGARDING FEDERALLY SPONSORED
5 RESEARCH OR DEVELOPMENT

6 Not Applicable

7 BACKGROUND OF THE INVENTION

8 This invention relates generally to the field of
9 window hardware and specifically to a tilt latch or pivot
10 housing.

11 Double hung windows are provided with counterbalances
12 for maintaining a sash in an elevated position. Springs or
13 weights connected to the sash act as the counterbalance.
14 Many window sashes are adapted for tilting inwardly for
15 cleaning. The sash tilts on a pivot assembly at the bottom
16 of the sash. Spring operated tilt latches at the top of
17 the sash retain the sash in the vertical position and are
18 released for pivoting of the sash. Latches, generally tilt
19 latches, are shown, for example, in U.S. Patents Nos.
20 4,837,975 to Simpson, 4,901,475 to Simpson, 4,167,835 to
21 Nobes, 4,578,903 to Simpson, 4,475,311 to Gibson, 4,955,159
22 to Rogers, 4,869,020 to Andres, 4,961,286 to Bezubic,
23 4,790,579 to Maxwell, 4,553,353 to Simpson, 4,475,311 to
24 Gibson, 4,400,026 to Brown, 4,791,756 to Simpson, 4,578,903
25 to Simpson, 4,320,597 to Sterner, 4,640,048 to Winner,
26 4,622,778 to Simpson, 4,624,073 to Randall, 4,669,765 to
27 Ullman, 5,301,989 to Dallmann, 5,028,083 to Mischenko,
28 5,096,240 to Schultz, 5,127,685 to Dallaire, 5,165,737 to
29 Riegelman, 5,014,466 to Winner, and 5,139,291 to Schultz,
30 all of which are incorporated herein by reference.

1 Figs. 14 and 15 show a prior art tilt latch housing.
2 A housing 250 includes a bottom wall 254, side walls 256, a
3 rear wall 258, and a top wall 260 defining a hollow cavity
4 262 opening at a front end of the housing. The top wall
5 260 defines a flange 264 at the top of the side and rear
6 walls 256, 258. Retainers 261 project from the side walls
7 256 and rear wall 258. Each retainer slopes outwardly from
8 the wall to a lip 269 that defines a catch for engaging
9 edges of a notch in a header rail of a sash. The space
10 between the lip 269 and flange 264 defines a gap or short
11 groove 263 for receiving an edge of the sash therein. A
12 retainer tab 270 projects downwardly from the bottom wall
13 254 near the front end of the housing 250.

Figs. 16 and 17 show another prior art tilt latch housing an upper part 351 and a lower part 353. The lower part 353 defines a bottom wall 354, external side walls 356, and a rear wall 358. The upper part defines internal side wall 357 and a top wall 360. The upper and lower parts 351, 353 are assembled to define a hollow cavity 362 opening at a front end of the housing. The top wall 360 defines a flange 364 at the top of the internal side walls 357 and spaced from the rear wall 358 and external side walls 356. The top edges of the side walls 356 cooperate with the flange 364 to define longitudinal grooves.

25 BRIEF SUMMARY OF THE INVENTION

26 The present invention provides a housing for
27 installation in a window frame having a window sash with a
28 notch defining a pair of opposed edges. The housing
29 includes side walls, a rear wall, and a top wall extending
30 beyond the side walls and rear wall to define a flange. A
31 retainer, such as a protuberance, projects from each of the
32 side walls. Each protuberance has an apex spaced from the
33 flange to define respective gaps for receiving the edges
34 therein. The finger projects from each retainer into the
35 respective gap. The fingers have a thickness permitting

1 flexing or shearing thereof when the edges are received in
2 the gaps.

3 Preferably, the side walls are provided with plural
4 protuberances each defining a respective gap between the
5 protuberance and the flange and each having a finger
6 projecting from the protuberance into the gap. The
7 protuberances are substantially evenly spaced along the
8 length of each side wall. The protuberances are triangular
9 and a corner of the triangle defines the apex. The
10 protuberances can be flared. A rear protuberance projects
11 from the rear wall and is spaced from the flange to define
12 a gap for receiving the rear edge of the notch. The
13 housing also includes a bottom wall and a retainer
14 projecting from the bottom wall near a front edge of the
15 bottom wall. The housing is molded as a single piece. A
16 pivot bar or movable bolt projects from the housing.

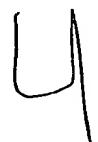
17 The invention also includes a window sash assembly. A
18 sash has a header rail and a stile joined at a corner and
19 having an opening in the sash. A tilt latch disposed in
20 the opening includes a housing having side walls, a rear
21 wall, and a bottom wall. A top wall extends beyond the
22 side walls and rear wall to define a flange. A
23 protuberance projects from each of the side walls, each
24 protuberance having an apex spaced from the flange to
25 define respective gaps for receiving the edges therein. A
26 bolt is movably disposed in the housing and adapted for
27 engaging a slide channel. A finger projects from each
28 protuberance into the respective gap.

29 BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

30 Fig. 1 shows a perspective view of a double hung
31 window according to the invention;

32 Fig. 2 shows a perspective view of a tilt latch and
33 part of a sash of the window;

34 Fig. 3 shows a side elevational view of the tilt
35 latch;



1 Figs. 4 and 4A show end views of different embodiments
2 of the latch;

3 Fig. 5 shows a bottom view of the latch with the
4 bottom cover removed;

Fig. 6 shows a top view of the latch;

Fig. 7 shows a perspective view of a pivot assembly and part of the sash;

Fig. 8 shows an end view of the pivot assembly;

Fig. 9 shows a side view of the pivot assembly.

10 Figs. 10 and 11 show a different embodiment of a
11 housing;

12 Figs. 12 and 13 show another embodiment of a housing;

13 Figs. 14 and 15 show a prior art tilt latch; and

14 Figs. 16 and 17 show another prior art tilt latch
15 housing.

16 **DESCRIPTION OF THE INVENTION**

Referring to Fig. 1, a double hung window assembly 10 includes an upper sash 11 and a lower sash 12 that are slidable in a window frame 14. The lower sash 12, for example, includes vertically disposed stiles 16 and horizontally disposed rails 18 including an upper header rail and a lower footer rail. The window frame includes vertical jambs 20 defining opposed vertical slide channels 22 or tracks. Brake assemblies 24 are slidable in respective slide channels 22. Lower corners of the sash 12 are provided with pivot assemblies 26 that are associated with respective brake assemblies 24 to define pivot and brake assemblies. The brake assemblies 24 are supported by respective counterbalances, such as balance springs 28 disposed in the slide channels 22. Tilt latches 30 are disposed in upper corners of the sash 12 for releasably retaining the upper end of the sash in the slide channels 22.

Referring to Fig. 2, an opening 32 is cut in the sash 12 for receiving the tilt latch 30 therein. The opening 32

1 includes a slot 34 in the header rail 18 defined by opposed
2 edges 36 blending into a U-shaped rear edge 38. The
3 opening also includes a slot 40 in the stile 16 defined by
4 opposed edges 42 and a bottom edge 44. The slot 40 has
5 notches 46 below the edges 36 of the slot 34 in the rail.
6 The edges 36 of the header slot 34 meet the edges 42 of the
7 stile slot 40 so that the opening 32 is continuous.

8 The tilt latch 30 includes a housing 50 and a movable
9 bolt 52 projecting therefrom. The housing 50 is sized to
10 fit in the opening 32 so that the bolt 52 extends outwardly
11 from the stile 16.

12 Referring to Figs. 3 and 4, the housing 50 includes a
13 bottom wall 54, side walls 56, a rear wall 58, and a top
14 wall 60 defining a hollow cavity 62 opening at a front end
15 of the housing. The top wall 60 defines a flange 64 at the
16 top of the side and rear walls 56, 58. A plurality of
17 retainers are provided at the side walls. The retainers
18 are preferably protuberances 65 projecting outwardly from
19 the side walls 56 of the housing. The protuberances are
20 preferably triangular each having an apex 66 spaced from
21 the flange 64 to define a gap 67. The protuberances 65 can
22 be isosceles or right triangles or another suitable shape
23 defining an apex. Each protuberance 65 is provided with a
24 finger 68 extending from the apex 66 into the gap 67. The
25 finger 68 preferably has a length of about 0.5 mm (.020
26 inch), that is about 30% of the gap 67, and a thickness of
27 about 0.5 to 0.8 mm. The finger is flexible, deformable,
28 and shearable as discussed below. The protuberances 65 are
29 preferably evenly spaced along the side walls 56. The
30 number and spacing of the protuberances 65 depend on the
31 dimensions of the window sash and housing. For a standard
32 household installation, four to five protuberances are
33 provided on each side. As shown in Fig. 4A, the
34 protuberances 65 can be flared from the side walls 56. One
35 or more protuberances 72 or rear flanges project from the
36 rear wall 58 and having a lip 74 or face spaced from the
37 flange 64 to define a gap 75.

1 Referring to Figs. 5 and 6, the bolt 52 is slidably
2 disposed in the cavity 62 of the housing. A spring 76
3 biases the bolt 52 forwardly to an extended position. A
4 post 78 extends between the top and bottom walls 60, 54
5 through a slot 80 of the bolt 52 and limits forward travel
6 of the bolt. The post 78 can provide for securing upper
7 and lower components of the housing. When the housing is a
8 single piece, the post can be omitted. A knob 88 provided
9 on the top surface of the bolt 52 projects through a slot
10 90 in the top wall 60 of the housing. A nose 89 of the
11 bolt is adapted for engaging in the slide channel 22 (Fig.
12 1) for retaining the sash in the window frame. The sash is
13 releasable by use of the knob 88 to retract the bolt 52
14 thereby disengaging the nose 89 from the channel 22.

15 Referring to Fig. 2, the tilt latch 30 is installed in
16 the sash 12. The rear end of the housing 50 is placed
17 adjacent the opening 32 in the stile 16. The housing 50 is
18 moved longitudinally so that the edges 36 of the slot 36
19 are received the gaps 67 closest to the rear end of the
20 housing. The edges 36 cause the respective fingers 68 to
21 flex thereby permitting passage of the edges through the
22 gaps 67. In some cases, all or part of the finger 68 will
23 be sheared from the side wall 56 and/or apex 66. As the
24 housing is moved longitudinally, the edges are sequentially
25 received in the respective gaps until the rear wall 58
26 engages the rear edge 38 and the retainer 70 engages behind
27 the wall of the stile 16 adjacent the bottom edge 44. The
28 rear edge 38 is received in the rear gap 75. The apexes 66
29 and fingers 68 engage the edges 36 at discrete points along
30 the length of the slot 34 providing a snug fit.

31 The tilt latch can also be installed according to an
32 alternative installation method (not shown). The rear wall
33 58 of the housing 50 is placed against the rear edge 38 of
34 the slot 34 so that the rear edge 38 is received in the
35 rear gap 75. The front end of the housing 50 is then
36 forced downwardly. The protuberances 65 move past the
37 edges 36 so that the edges 36 are received in the gaps 67.

1 As the edges 36 move into the gaps 67, the fingers 68 are
2 flexed or sheared. The apexes 66 and fingers 68 engage the
3 edges 36 at discrete points along the length of the slot 34
4 providing a snug fit. The retainer 70 engages behind the
5 wall of the stile 16 adjacent the bottom edge 44. The
6 housing construction shown in Fig. 4A is particularly
7 suitable for this installation method.

8 Referring to Figs. 7, 8 and 9, the pivot assembly 26
9 includes a housing 132 with a pivot bar 134 located
10 therein. The housing 132 includes a body 136 having a
11 longitudinal bore 138. The bore 138 shown is generally
12 rectangular, but other shapes are suitable as is apparent
13 from the following description of the pivot bar 134. The
14 bore 138 is stepped, that is, different parts of the bore
15 have different cross-sectional dimensions and shapes. One
16 end of the bore defines a mouth 140 slightly wider than the
17 pivot bar 134 to facilitate installation and allow slight
18 flexing thereof. A main part 142 of the bore is sized to
19 snugly retain the pivot bar 134 therein. Another end of
20 the bore is circular in cross section and defines a stop
21 144 against which the pivot bar 134 abuts. Adjacent the
22 stop, a bottom wall is recessed to define a lip 146. The
23 pivot bar 134 has a U-shaped cross section of formed metal.
24 One end of the pivot bar is provided with laterally
25 extending flanges 148. A detent (not shown) projects from
26 a bottom wall of the pivot bar near another end. The pivot
27 bar 134 is located within the bore 138 of the housing 132
28 so that the pivot bar detent engages behind the lip 146 to
29 prevent longitudinal movement of the pivot bar in one
30 direction. An end of the pivot bar 134 engages the stop
31 144 to prevent longitudinal movement of the pivot bar in
32 another direction. The pivot bar projects from the housing
33 132 so that the flanges are spaced from the housing.

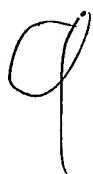
34 Referring to Fig. 7, the lower end of the sash stile
35 16 is provided with a notch 149 or slot to allow passage of
36 the pivot housing 132 therethrough. A second notch 150 or
37 slot is cut in a lower wall of the lower rail 18 to define



1 a pair of opposed edges 151. The second notch 150 is as
2 long as the housing 132.

3 Referring to Figs. 8 and 9, the housing 132 includes a
4 top wall 154, side walls 156, a rear wall 158, and a bottom
5 wall 160. The bottom wall 160 defines a flange 164 at the
6 bottom of the side and rear walls 156, 158. Retainers are
7 provided at the side walls, such as plurality of
8 protuberances 165 project outwardly from the side walls 156
9 of the housing. The protuberances are preferably
10 triangular each having an apex 166 spaced from the flange
11 164 to define a gap 167. The protuberances 165 can be
12 isosceles or right triangles or another suitable shape
13 defining an apex. Each protuberance 165 is provided with a
14 finger 168 extending from the apex 166 into the gap 167.
15 The finger 168 preferably has a length of about 0.5 mm
16 (.020 inch), that is about 30% of the gap 67, and a
17 thickness of about 0.5 to 0.8 mm. The finger is flexible,
18 deformable, and shearable as discussed below. The
19 protuberances 165 are preferably evenly space along the
20 side walls 56. The number and spacing of the protuberances
21 165 depend on the dimensions of the window sash and
22 housing. For a standard household installation, five to
23 seven protuberances are provided on each side. The
24 protuberances can be flared from the side walls. A rear
25 protuberance 172 or rear flange projects from the rear wall
26 158 and has a lip 174 or face spaced from the flange 164 to
27 define a gap 175. A retainer 170 projects from the top of
28 the body near one end.

29 Referring to Figs. 10 and 11, the housing 350 includes
30 an upper part 351 and a lower part 353. The lower part 353
31 defines a bottom wall 354, external side walls 356, and a
32 rear wall 358. The upper part defines internal side walls
33 357 and a top wall 360. The upper and lower parts 351, 353
34 are assembled to define a hollow cavity 362 opening at a
35 front end of the housing. The top wall 360 defines a
36 flange 364 at the top of the internal side walls 357 and
37 spaced from the rear wall 358 and external side walls 356.



1 Retainers, such as plurality of protuberances 365, project
2 upwardly from the external side walls 356 of the housing.
3 The protuberances are preferably triangular each having an
4 apex 366 spaced from the flange 364 to define a gap 367.
5 The protuberances 365 can be isosceles or right triangles
6 or another suitable shape defining an apex. Alternatively,
7 the protuberances can be rectangular. Each protuberance
8 365 is provided with a finger 368 extending from the apex
9 366 into the gap 367. The finger 368 preferably has a
10 length of about 0.5 mm (.020 inch), that is about 30% of
11 the gap 367, and a thickness of about 0.5 to 0.8 mm. The
12 finger is flexible, deformable, and shearable. The
13 protuberances 365 are preferably evenly space along the
14 external side walls 356. The number and spacing of the
15 protuberances 365 depend on the dimensions of the window
16 sash and housing. For a standard household installation,
17 five to seven protuberances are provided on each side. A
18 rear protuberance 372 projects from the rear wall 358 and
19 has a lip 374 or face spaced from the flange 364 to define
20 a gap.

21 Referring to Figs. 12 and 13, the housing 450 includes
22 a bottom wall 454, side walls 456, a rear wall 458, and a
23 top wall 460 defining a hollow cavity 462 opening at a
24 front end of the housing. The top wall 460 defines an
25 upper flange 464 at the top of the side and rear walls 456,
26 458. A retainer, such as a lower flange 461, projects
27 outwardly from the side walls 456 and rear wall 458 of the
28 housing. The lower flange 461 and upper flange 464
29 cooperate to define a longitudinal groove 463. Plural
30 fingers 468 extend upwardly from the lower flange 461 into
31 the groove 463. The finger 468 preferably has a length of
32 about 0.5 mm (.020 inch), that is about 30% of the groove
33 463, and a thickness of about 0.5 to 0.8 mm. The finger is
34 flexible, deformable, and shearable. The fingers 468 are
35 preferably evenly space along the side walls 456. The
36 number and spacing of the fingers 468 depend on the
37 dimensions of the window sash and housing. Similarly,

1 fingers can be provided projecting upwardly from the lips
2 269 of the retainers 261 shown in Figs. 14 and 15.

3 Referring to Fig. 2, the pivot assembly 26 is
4 installed in the sash 12. The rear end of the housing 132
5 is placed adjacent the notch 149 in the stile 16. The
6 housing 132 is moved longitudinally so that the edges 151
7 of the slot 150 are received the gaps 167 closest to the
8 rear end of the housing. The edges 151 cause the
9 respective fingers 168 to flex thereby permitting passage
10 of the edges through the gaps 167. In some cases, all or
11 part of the finger 168 will be sheared from the side wall
12 156 and/or apex 166. As the housing is moved
13 longitudinally, the edges are sequentially received in the
14 respective gaps until the rear wall 158 engages the rear
15 edge of the slot 150 and the retainer 170 engages behind
16 the wall of the stile 16 adjacent the top edge of the notch
17 149. The rear edge is received in the rear gap 175. The
18 apexes 166 and fingers 168 engage the edges 151 at discrete
19 points along the length of the notch 150 providing a snug
20 fit.

21 The pivot assembly can also be installed according to
22 an alternative installation method (not shown). The rear
23 wall 158 of the housing 132 is placed against the rear edge
24 of the notch 150 so that the rear edge is received in the
25 rear gap 175. The front end of the housing 132 is then
26 forced upwardly. The protuberances 165 move past the edges
27 151 so that the edges 151 are received in the gaps 167. As
28 the edges 151 move into the gaps 167, the fingers 168 are
29 flexed or sheared. The apexes 166 and fingers 168 engage
30 the edges 151 at discrete points along the length of the
31 notch 150 providing a snug fit. The retainer 170 engages
32 behind the wall of the stile 16. A housing construction
33 similar to that shown in Fig. 4A is particularly suitable
34 for this installation method.

35 The present disclosure describes several embodiments
36 of the invention, however, the invention is not limited to
37 these embodiments. Other variations are contemplated to be

1 within the spirit and scope of the invention and appended
2 claims.

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